Module Title/Name: **Ophthalmic Lenses**  
Module Code: **OP1OL1**

School: **Life and Health Sciences**  
Module Type: **Standard Module**

New Module? **No**  
Module Credits: **20**

### Module Management Information

<table>
<thead>
<tr>
<th>Module Leader Name</th>
<th>Robert Cubbidge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Address</td>
<td><a href="mailto:cubbidrp@aston.ac.uk">cubbidrp@aston.ac.uk</a></td>
</tr>
<tr>
<td>Telephone Number</td>
<td>Not Specified</td>
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<tr>
<td>Office</td>
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**Level Description:**  
**Cert He/Level 4 (Enhanced Honours)**

**Available to Exchange Students?**  
Not Specified

### Module Learning Information

**Module Aims:**  
This module introduces the optical principles of ophthalmic lenses, and the properties of spectacle lenses and frame materials. The module will cover both the theoretical properties and practical manipulation of basic forms of single vision and bifocal spectacle lenses and provide an introduction to the practical considerations of dispensing spectacle lenses and frames. It is expected that students are competent at mathematics to GCSE level as the module requires knowledge of algebraic rearrangement, indices and trigonometry.

**Module Learning Outcomes:**  
Module Outcomes ? what the student should gain from successful completion of the module:

**Knowledge and Understanding**

1. Measure and describe, in both practical terms and by calculation, the various characteristics of single vision and bifocal spectacle lenses.
2. Demonstrate knowledge and theory of spectacle lenses, so as to understand new technology as it arises and make be able to make clinical decisions based on this knowledge.
3. Be able to demonstrate knowledge of frame construction and appreciate the limitations of materials used in their manufacture.

**Intellectual Skills**

1. Decision making.
2. Be able to interpret physical and optical lens data and apply it to the selection of the optimal lens material for a patient.
Professional/Subject Specific Skills

1. Ability to practically measure lens power using focimetry, by measurement of lens curvature and thickness, and hand neutralisation.
2. Ability to manipulate the various forms spectacle prescriptions and relate them to the manufacturing form of the spectacle lens.
3. Ability to identify single vision and bifocal lens forms.
4. Ability to identify, describe, measure and manipulate frame materials.
5. Ability to identify surface treatments on lenses and make clinical decisions requiring their use.
6. Ability to make clinical decisions on appropriateness of different frame types and materials for a patient.

Transferable Skills

1. Independent study
2. Interpersonal communication
3. Recording, analysing and presenting data
4. Numeracy
5. Accurate observation and measurement
6. Knowledge acquisition
7. Safe laboratory practice
8. Critical thinking and problem solving
9. Clinical optometry skills

Indicative Module Content:

Single vision spectacle lenses
- Optical principles governing the correction of ametropia with spectacles.
- Ophthalmic lens sign conventions: conventions for astigmatic lens axes and prism base settings.
- Refractive Index, refraction at a plane surface, Snell’s Law, real and apparent thickness.
- Paraxial optical theory, refraction at a curved surface, vergence, thin and thick lens power, step along and formulaic methods for calculating vergence through thick lenses. The influence of vertex distance on lens power.
- Spectacle magnification and its significance in anisometropia.
- Lenses for astigmatism, sphere-cylinder, crossed cylinder and toric prescriptions and their transposition. Spherical and toric lens forms.
- Manual, projection and electronic focimeters and their uses for measurement of vertex power and prismatic power: optical principles, range, accuracy and limitations
- Mass production and optical properties of glass and plastic lenses. Selection of lens material in dispensing.
- Lens surface treatments and their uses; including tints, hard coatings, anti-reflection coatings, reflection filters and polarising lenses.
- The significance of spectacle lens aberrations and their role in the design of spectacle lenses.
- An appreciation of British, European and International standards governing lens manufacture.

Spectacle frames
- Frame materials: historical perspectives, plastic and metal materials in current usage and their properties, manufacturing, and uses. Frame components and description of frames. Standards governing manufacture.

Bifocal spectacle lenses
- History and manufacturing techniques, optical properties and compromises in lens design.

Module Delivery

Methods of Delivery & Learning Hours (by each method):

<table>
<thead>
<tr>
<th>Method of Delivery</th>
<th>Learning Hours</th>
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<tbody>
<tr>
<td>Lecture</td>
<td>22 hours</td>
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<tr>
<td>Tutorial</td>
<td>8 hours</td>
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<tr>
<td>Practical</td>
<td>24 hours</td>
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<tr>
<td>Scheduled Reflection</td>
<td>24 hours</td>
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<tr>
<td>Independent Study</td>
<td>100 hours</td>
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<tr>
<td>Pre-Reading</td>
<td>22 hours</td>
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Learning & Teaching Rationale:
Teaching of this module is through a combination of structured 50 minute lectures, practical classes and tutorials solving optical problems. You are required to attend one-hour practical classes on a weekly basis. From week 7, you will be required to attend four two-hour tutorials which take place according to a rota. The practical class and tutorial rotas can be found in the module information on Blackboard, which will be used to communicate all course material. To gain the most from lectures, you should read handouts in advance of the lectures, make notes during the lectures and reflect and consolidate on the lecture afterwards by making your own additional notes from text books in the library.

Module Assessment

Methods of Assessment & associated weighting (including approaches to formative assessment as well as summative):

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Category</th>
<th>Duration/Submission Date</th>
<th>Common Modules/Exempt from Anonymous Marking Details</th>
<th>Assessment Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>December/January Exam</td>
<td>Closed Book</td>
<td>1:00hrs</td>
<td>-</td>
<td>15%</td>
</tr>
<tr>
<td>Details</td>
<td>Multiple Choice Questions</td>
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<td></td>
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<tr>
<td>Practical</td>
<td>Individual Assignment</td>
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<td>Yes</td>
<td>20%</td>
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<tr>
<td>Details</td>
<td>Four practical assessments, each contributing 5% towards the practical weight of the module: Assessment 1: Lens Identification, Vertex Power Calculation Assessment 2: Focimetry of Single Vision Spectacles Assessment 3: Hand Neutralisation of Lenses Assessment 4: Bifocal Focimetry, Measurement and Description We are committed to providing you with feedback to enhance your learning by enabling you to identify your strengths and weaknesses to improve your future performance. Assessment results will be returned to you within four term weeks of completion. This will contain specific feedback of errors made during the assessment. These will be explained to you individually by the module co-ordinator.</td>
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<tr>
<td>February to June Exam</td>
<td>Closed Book</td>
<td>2:00hrs</td>
<td>-</td>
<td>65%</td>
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<tr>
<td>Details</td>
<td>Multiple Choice Questions and Short Answer Questions</td>
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Total: 100%

Method of Submission:
Hard Copy Only

Assessment Rationale:
Practical Assessments and Written Examinations

Feedback Rationale:
From us
We are committed to providing you with feedback to enhance your learning by enabling you to identify your strengths and weaknesses to improve your future performance.

Assessment results will be returned to you within four term weeks of completion. This will contain specific feedback of errors made during the assessment. These will be explained to you individually by the module co-ordinator. General feedback on the mid-sessional examination will be provided to students in lectures. Students who are having general difficulties with the module are encouraged to make an appointment with the module co-ordinator.
Alongside our commitment to provide you with timely and informative feedback, there is an expectation that you will provide us with feedback when asked, such as module feedback surveys. It is essential that you use this opportunity to provide constructive feedback about this module and the course in general so that we can understand what works well and anything that we might need to do differently. Module feedback surveys will be issued to you in the last week of the first two terms.